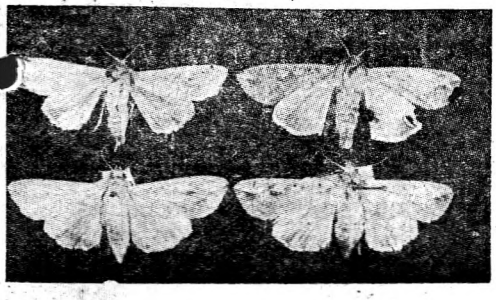
Entomologists' NEWSLETTER

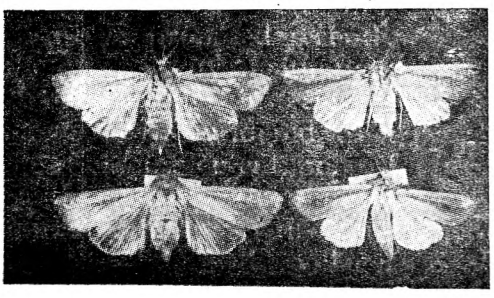
Volume I March, 1971 Number 3

DIFFERENT SPECIES LOOK APPARENTLY ALIKE

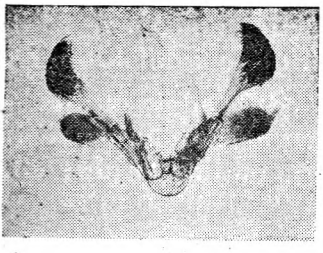
PSEUDALETIA SEPARATA

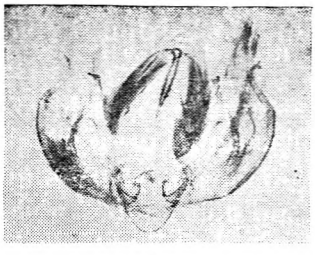


CIRPHIS LOREYI



GENITALIC STUDIES CLARIFY THE ISSUE





This suggests the utmost need for adequate Insect Identification Service
(Please see the article on pp. 17-18)

Issued by
DIVISION OF ENTOMOLOGY
INDIAN AGRICULTURAL RESEARCH INSTITUTE
NEW DELHI-12.

Appreciation

I have received the first issue of the Entomologists' Newsletter for January 1971. I have read it with interest and I hope that this new venture of the Division of Entomology of the Indian Agricultural Research Institute will meet with much success. In our endeavours to increase greatly the agricultural production as a basis for the future prosperity of our country, it is very important that special attention should be paid to Entomological research so that new knowledge will be continually added, to enable us to control the many pests which cause damage and great loss to our economic plants and their products, both in the field and in storage. I send my best wishes to Dr. S. Pradhan, Head of the Division of Entomology, I. A. R. I. and the group of scientists working in this field and trust that the future will bring them further success.

B. P. Pal
Director General,
Indian Council of Agricultural Research
New Delhi

National Insect Identification Service at I.A.R.I.

The Entomology Division of the Indian Agricultural Research Institute, as is well known, has been maintaining an Insect Identification Service from its very inception in 1905 at Pusa (Bihar). The continuously growing demands for the establishment of the correct identities of various insects encountered with by different persons working in the public or private sectors all over the country together with the inadequacy of the staff available for the purpose in this Institute has been necessitating the reference of many such insects to the Commonwealth Institute of Entomology, London, for the settlement of their identities. Recently in a conference of Commonwealth Entomologists held in London from the Ist to 3rd July, 1970, a resolution to the effect that all member countries of the Commonwealth should develop and augment their own identification services and should rely on their services, has been accepted. Hence it has become imperative that the service undertaken by this Institute should be adequately strengthened for the purpose. This is presently under consideration by the Indian Council of Agricultural Research.

The National Pusa Collection (NPC) forms the basis for the identification of insects in this Institute. Out of an estimated number of fifty thousand species of Insects so far on record from this country, the collection presently contains only about fifteen thousand of them. Yet, this is the best available insect collection in this country. This collection is an invaluable national asset and its careful maintenance and augmentation is to be perfectly ensured for the ready and correct establishment of the identities of any Indian insect. Any amount of descriptive literature may be found inadequate for specific identifications and recourse to careful comparisons with correctly identified material in the collection only can solve the problem.

In the past, only superficial comparisons have been made either with literature or even with duly identified material landing one in erroneous identifications. To cite a few examples, it has recently been found that Distant's description of one of the homopteran bugs from India could be applied to as many as five different species which may be distinguished readily on the basis of characters afforded by the male genitalia only. Again, it has recently been shown that what

has been taken so long within our country as the armyworm *Cirphis unipuncta* (Haworth) is not that species at all, but another closely related species. *Pseudaletia separata* (Walker); this has again been possible only on the basis of the study of their male genitalic armatures (please see cover illustration). Like wise what has been taken as the sunnhemp moth, *Utetheisa pulchella* (Linnaeus) is now found to be comprised of really different species. A good deal of intensive taxonomic research with extensive material from all over the country is thus imminently needed.

The establishment of the correct identity is of paramount importance in undertaking any work from the fundamental or applied view points with any species. It is thus obvious that the NCP should be augmented with elaborate survey and studies and made fully representative of the Indian insect fauna. Towards this end the full co-operation of all entomologists in different parts of the country is solicited.

M.G.R. Menon

Monograph of Indian Psyllidae (Hemiptera)

A monograph of Indian Psyllidae has been prepared by Dr. R. N. Mathur, Retired Chief Research Officer (Forest Entomologist) and Head, Division of Forest Protection, F.R.I. Dehra Dun.

Catalogue of Indian Pyraustinae (Lepidoptera : Pyralidae)

References to Indian Lepidoptera, including Pyralidae, were brought together in a series of the fauna of British India by Sir George Hampson about 75 years ago. Since then many new genera and species have been added and many nomenclatural changes have been introduced, In view of this a catalogue incorporating the details of synonyms, homonyms, distribution and hosts of the subfamily Pyraustinae has been prepared by Sarvashree N.S. Bhattacherjee and S. L. Gupta.

Editors

New Records of Mites (Acarina)

Suidasia medanesis Oudemans, a tyroglyphid and *Acarophenax tribolii* Newstead and Duvall, a scutacarid mite were found in large numbers infesting cultures of *Cadra cautella* (Walker) and *Tribolium castaneum* (Herbst) respectively. While the former predates on the eggs of *Cadra*, the latter is found attached to the soft cuticle of the body of adult *Tribolium* and also beneath the second pair of wings. These mites are new records from India.

Swaraj Ghai & M.G.R. Menon

New Record of a Fruitfly Species (Diptera : Thephritidae)

Dacus (Strumeta) diaphorus (Hendel) has so far been recorded from Formosa only. While identifying the unnamed fruitfly specimens of NPC, a female specimen of this species was found collected in 1905 from Pusa (Bihar), on pumpkin.

V. C. Kapoor

Some New Host Records of Insects

To meet the requirements of Plant Breeders the world over considerable volume and variety of seed material are exchanged every year between different countries. During the course of examination of such material imported into India and intended for export, the following new host records were made :

Pest	Host	Origin of host seed
Acanthoscelides sp.	*Tephrosia toxicara*	Brazil
Bruchidius sp.	*Sesbania aculeata*, *Acacia concinna*	India
B. multivariegatus (Pic)	*Glycine javanica*	Kenya
Caryedon serratus (Olivier)	*Acacia leucophloea*	India
C. languidus (Gyllenhal)	*Prosopis juliflora*	India
Spermophagus tessellatus (Motschulsky)	*Hibiscus canabinus*	India
Araecerus fasciculatus DeGeer	*Syzygium aromaticum*)	India

Pest	Host	Origin of host seed
Gonocephalum sp.	*Elusine*	India
G. inaequale Gridelli	*Hibiscus canabinus*	India
Ptinus tectus Boield	*Dactylis glomerata*	Italy
Bruchophagus gibba Boheman	*Colutea istria*	Israel
Systasis cenchrivora Farooqi (MS.)	*Cenchrus ciliaris*	India

S.R. Wadhi, B.R. Verma and K.M. Srivastava

Host Record of *Callitula bipartitus* Farooqi (MS.)

Callitula bipartitus was recorded parasitising the grubs of sorghum shoot fly, *Atherigona varia soccata* Rondani at Udaipur during August to September. The extent of parasitism was very low.

G.G. Kundu, Prem Kishore & M. G. Jotwani

Blister Beetles as Pests of Sorghum

The blister beetles, *Mylabris pustulata* Thunberg and *Lytta tenuicollis* (Pallas) already reported from the South as occasionally feeding on the sorghum blossoms have been observed as serious pests of developing grains of sorghum at Vallabnagar (Udaipur) continuously for four years since 1967. On an average eight adult beetles were found feeding on each ear-head. Surprisingly the surveys carried out in other parts of the northern and western regions of the country did not show the incidence of these beetles on sorghum. Spraying the ear-heads either with 0.15% carbaryl W.P. or with 0.05% endosulfan E.C. gave satisfactory protection to the ear-heads.

G. G. Kundu, Prem Kishore & T. R. Sukhani

Nomenclatural Changes

Ghauri (1967) has transferred the cotton jassid, *Empoasca devastans* Distant, a serious pest of cotton, to his new genus *Amrasca*. Hence the correct name of the jassid is now *Amrasca devastans* (Distant).

Usha Ramakrishnan

Trichogramma evanescens minutum Riley, the well known egg parasite of sugarcane borers occurring in India is now established as *T. australicum* Girault by S. Nagarkatti and H. Nagaraja of Commonwealth Institute of Biological Control, Banglore, Mysore.

Atma Ram

Types Incorporated in the National Pusa Collection

Anechura pirpanjalae Kapoor	Dermaptera	Forficulidae
A. nayyari Kapoor	,,	,,
A. virgae Kapoor	,,	,,
Forficula baijali Kapoor	,,	,,
F. genitalia Kapoor	,,	,,
F. indie Kapoor	,,	,,
F. cherapunjiae Kapoor	,,	,,
Kosmetor josephi Kapoor	,,	,,
Calcolampra simlansis Baijal & Kapoor	Dictyoptera	Blattidae

Usha Ramakrishnan

Hiding Habitat of *Aulacophora*

While conducting surveys for *Aulacophora* adults during their off season, they were discovered hiding amidst grass roots in the Tihar village of Delhi. Here the fields had cucurbit crops during last summer and rainy seasons and now they have crops like potato, wheat, radish, cabbage and garlic. Some of the bunds of these fields have bushy castor plants covered with climbing beans on account of which there is enough shade. When the debris of decayed matter and fallen leaves covering the grass under castor plants was removed, and the grass uprooted, large numbers of these beetles were located resting in inactive state among the roots. If such pockets of off-season *Aulacophora* are located they may be picked up and easily destroyed by dipping them in kerosene oil, instead of resorting to control this pest during the coming cucurbit season when they become active and get dispersed.

Roshan Lal

Persistence of Malathion in Stored Grains

It was reported in 1965 from this Division (Division of Entomology) that wheat at 13% moisture content when treated with malathion dust to a level of 24 ppm and further stored at 28° C., the biological effectiveness of malathion is lost within 3 to 4 months as tested against *Sitophilus oryzae* Linnaeus and *Tribolium castaneum* (Herbst). It has now been found that when sorghum at less than 10% moisture content is treated with malathion at 30 ppm level and stored under room conditions, the biological effectiveness lasts as long as 10 months as tested against *Rhizopertha dominica* Fabricius, *T. castaneum*, *S. oryzae* and *Corcyra cephalonica* Stainton. Thus it appears that the persistence of malathion varies from grain to grain.

P.B. Mookherjee, B.N. Bose & S. Singh

Relative toxicity of insecticides against larvae of *Agrotis ypsilon* Rottenburg

Eleven insecticides were tested as dusts for their toxicity to the larvae of the potato cutworm, *A. ypsilon*. The order of toxicity was found to be aldrin, heptachlor, endrin, dieldrin, lindane, parathion, malathion, toxaphene, carbaryl, chlordane, and B.H.C. in the descending order. LC_{50} of aldrin and B.H.C. worked out to be 1.99 and 6.44 respectively. This information, along with the availability and price can be used for selecting various insecticides for large scale field trials.

Sukumar Ray

Vitamin-synthesis and Nitrogen-fixation by the Symbiotic Bacteria of *Sitophilus oryzae* Linnaeus

Sitophilus oryzae is among the insects which contain intracellular symbiotic bacteria in the midgut caecae of adult. These microorganisms are transmitted from generation to generation through ovarial infection.

For the first time the bacterium was isolated and cultured from egg, ovary and intestinal caecae. It was identified as a species closely resembling *Bacillus circulans*. With the help of technique of raising insects on artificial pellets it is established that *Sitophilus* can grow in the absence of certain vitamins essential for insects in general.

Entomologists' NEWSLETTER

Volume I April, 1971 Number 4

(**Please see article on Carbofuran Seed treatment on page 30**)

Issued by
DIVISION OF ENTOMOLOGY
INDIAN AGRICULTURAL RESEARCH INSTITUTE
NEW DELHI-12.

Some more Appreciations

.....The newsletter is quite useful and full of information.....I wish to congratulate you on starting this Newsletter. My only suggestion is that the scope of this Newsletter may be enlarged.

A.R. Seshadri
Head, Division of Nematology
I.A.R.I., New Delhi-12.

.....This will be the nucleus, I am sure, for many important discoveries in future.....

D.C. Dakshinamurti
Head, Division of Agricultural Physics
I.A.R.I., New Delhi-12.

.....I am sure this will be a source of valuable information for people engaged in the field of Entomology and related areas.

A.M. Michael
Professor, Water Technology Centre
I.A.R.I., New Delhi-12.

.....I have read it with great interest. Will you kindly put my name on the mailing list ?.....

R.S. Saini
Associate Professor
Tuskegee Institute, College of Arts & Sciences
Division of Natural Sciences Deptt. of Biology
Albama 36088 (U.S.A.).

.....This venture of yours opens up a new channel of communication among the scientists interested in the discipline of Entomology as well as those engaged in sister disciplines. Your article on "Revolution in Pest Control" is thought provoking and I hope that the suggestions made regarding the adequate surveillance of pests will be taken up in this country.....

B.L. Wattal
Deputy Director
National Institute of Communicable Diseases
New Delhi.

Policy Regarding Mixing of Pesticides in Food and Feed Grains

According to the existing rules made for the prevention of adulteration in food by the Ministry of Health, Government of India, the mixing of pesticides with food grain is prohibited. Also the policy followed by the Indian Agricultural Research Institute has been from the very beginning not to recommend the treatment of food grain with any pesticide except fumigants. In spite of these prohibitions both from official and scientific sources it is believed that some ignorant or unscrupulous people have been treating food grains with easily available insecticides like DDT and BHC. This has been causing increasing concern both to scientists and to public in general and various common sense solutions have been suggested. One of the suggestions has been the exploration and recommendation of safer substitutes for insecticides like DDT and BHC and as a consequence of this line of approach certain substitutes are being offered now in the form of some safer members of the organophosphorous group. Hence the intention of this note is to stimulate some open thinking on this topic to avoid our jumping from the frying pan to the fire.

This problem has to be viewed from several angles, *viz.*—

(a) The defects of an insecticide come up with time after it is introduced. For example DDT being the oldest of the modern insecticides, it has been attacked from all possibles angles and practically all its bad points are well established. Hence it is the main target so far as the adverse effects of pesticides are concerned. Hence not much effort is needed to decry it and persuade people against its use. The same is not so easy with a newer insecticide like malathion against which we do not know as much as we know against DDT. The result is that some people are coming up with the recommendation that malathion should be mixed with food grains. The following considerations will show that such a recommendation is analogous to jumping from the frying pan to the fire. Certainly we should take all possible actions against the DDT treatment of food grains but the recommendation of malathion is not a solution; otherwise the solution may prove to be far more dangerous than the problem itself

(i) The greatest apprehension against DDT is due to its cummulative nature. It is a very frightening property but what does it mean? It means that the body fat absorbs it and makes it not available for its toxic action for the time being. This goes on and the amount of DDT per unit quantity of body fat goes on increasing upto a limit at which a plateau is reached beyond which DDT content of the body fat does not increase. This plateau quantity depends on the concentration of DDT in the contaminated food. However, beyond this plateau DDT goes on getting excreted in some form or the other without causing any serious damage till its concentration in the food increases beyond some critical levels. The accumulated DDT of the body fat brings about its toxic effect if it becomes suddenly released due to the consumption of fat during fasting or starvation. These are the types of harms involved in the indiscriminate use of DDT due to which we do not allow DDT treatment of food grains. Now let us consider what type of risk is involved in malathion:

(ii) Malathion is said to be non-cumulative but it is an acute poison which causes quick death; its acute damage itself can be cummulative which is much more dangerous. It inhibits the cholinesterase activity. During ordinary spray application it is recommended that as soon as the cholinesterase reduction reaches a particular level the worker should be taken off from the spraying job and kept away till his cholinesterase level becomes normal. Now that kind of precaution is not possible if the cholinesterase level is getting reduced due to the food contamination and it may be too late when he begins to show up the toxic symptoms.

(iii) The malathion residue in grain is known to get reduced below the tolerance limit after a few months of storage. The problem to be solved is what about the risk during that period of a few months. Is it practicable to label the grain as unfit for human consumption? Will a person who has treated his grain with malathion desist from selling it if he gets a good offer before it has become fit for human consumption?

(iv) It will be difficult to apply the legal check in the case of malathion because even if some deaths occur due to malathion contamination, this contamination may get considerably reduced by the time the formalities of legal procedures connected with residue determination in the grain are completed.

(v) Even some of the known data available for malathion seem to require re-checkup. The death of 2 persons and illness of a very large number employed in the application of malathion in malaria eradication programme are difficult to explain fully on the basis of known data about malathion.

(vi) Again while some residue studies have shown that malathion contamination gets reduced rather quickly, some of the other recent studies have shown that the persistence of the residue depends very much on temperature and moisture content of the grain. Hence under certain circumstances the dangerous contamination may remain much longer than ordinarily expected and conusmers may get caught unawares.

(vii) Even under the same environmental conditions, the malathion residue lasts for different periods. For example in sorghum it has been found in this Division that malathion remains effective much longer than in wheat.

(viii) It is true that malathion has been used in some countries in treating the grain before it is loaded in the ship for export. This is tolerable in case the lot of the grain so treated is to remain on the high seas for a considerable period before reaching its destination and if the dose is such that it will be decomposed during its transit. Also such a treatment may be tolerated under special conditions when its long range storage is fully ensured. These are very specialised conditions.

(ix) Recent studies have shown that some storage pests are getting quickly resistant to malathion even where malathion has been used for surface treatment. This may lead the users to increase the quantity of the chemical applied. Thus there is a likelihood that the efficacy of this chemical may go on decreasing and its hazards may go on increasing as time passes on. Thus the safety limit which should always have a fair margin for casual errors, will go on getting narrower and narrower in the case of malathion.

(x) Once the Governmental agencies give a green light for mixing one insecticide say malathion, the user may get all the more used to this idea and may take the liberty of mixing even other more hazardous chemicals and the question of checking people from this undesirable practice may get much more complicated.

(b) Recent studies in Punjab have shown that the cultivator does not gain much by treating the grain with malathion because what he gains by reducing insect infestation he loses largely in the form of the cost of chemical treatment. This reduces the economic utility of malathion treatment to the individual cultivator and if the risk in the form of hazard involved is also taken into consideration the balance will all the more tilt against malathion treatment.

(c) No poisonous chemical should be tolerated in the food-stuff, howsoever less hazardous it may be, unless it is considered absolutely essential. This is one of the principles on which tolerance limits of various pesticides are fixed. From this point of view the mixing of pesticide with food grain is not justified. Non-chemical ways of keeping the grain safe are always to be preferred. Pusa Bin has made it quite nunecessary to treat grain chemically. Studies in Punjab have shown that even storing grain with 'bhusa' keeps it very safe. Under these circumstances a green light in favour of mixing a poisonous chemical cannot be justified even on the basis of the need for protecting the grain.

In the foregoing paragraphs, emphasis has been laid only on DDT and malathion because the former is already the most maligned insecticide and malathion is being considered as the safest. The rest come in between. Thus if the safest is not safe enough even as a sustitute for the most maligned DDT, the question of treating food grain with insecticides, except fumigants should not be seriously taken up under the present circumstances.

S. Pradhan, N S. Agrawal* & P. M. Thomas**

A New Record of A Fulgorid at Delhi

Tripetimorpha formosana Ishihara (1954) so far described only from a single female specimen from Formosa has been observed at Delhi on a grass in fair numbers during October. Twelve specimens, both males and females, have been collected and deposited in the N.P.C.

M.G.R. Menon & Swaraj Ghai

*Director, Storage & Inspection, Ministry of Food & Agriculture, Dept. of Food, New Delhi.

**Regional Manager, Food Corporation of India, C.T.O. Buildings, New Delhi-12.

New Host record of *Tetrastichus nyemitawus* Rohwer and *Tetrastichus* sp. (Hymenoptera : Eulophidae)

T. nyemitawus and *Tetrastichus* sp. were reared from *Atherigona naqvii* infesting wheat seedlings at Udaipur. This pest has not been recorded so far as host of these parasites.

G G. Kundu & Prem Kishore

Occurrence of *Neochrysocharis* sp. with a new host record in India

Neochrysocharis sp (Hymenoptera : Eulophidae) been recently reared by the authors from the grubs of *Atherigona naqvii* Steyskal infesting wheat seedlings at Udaipur. The identity of this parasite has been established by the Common Wealth Institute of Entomology. There is so far no published record of this parasitic genus from India or *A. naqvii* as its host from any part of the world.

G. G. Kundu & Prem Kishore

Screening Sorghum Germ plasm for Resistance Against shootfly

From trials on screening of Sorghum germ plasm for resistance against shootfly, a number of lines were selected as highly promising. In 'Kharif' 1970, seventy-nine lines were critically examined for ovipositional response of the shootfly. Average number of eggs per plant in I.S. Nos. 5469, 5490 and 4664 was found to be 0 13 as against 1.36 and 1.46 in the susceptible checks CSH I and Swarna respectively. It is strongly indicated that non-preference for oviposition is possibly a factor responsible for relatively less damage due to shootfly in these lines.

M.G. Jotwani, G.C. Sharma and B.G. Srivastava

Relative toxicity of insecticides to the grey weevil

Eighteen pesticides were tested as emulsion sprays for their toxicity to the adults of the grey weevil, *Myllocerus undecimpustulatus maculosus* (Desbrochers), infesting soybean crop. The descending

order of toxicity was found to be methyl parathion, lebycid, DDT, mecarbam, phosphamidon, foliothion, ethyl parathion, trichlorphon, elsan, EPN, malathion, mevinphos, formothion, endosulfan, gusathion, carbophenothion, thiodometon and morphothion. The LC_{50} values of methyl parathion and morphothion were found to be 0.001172 and 0.097270 respectively.

Shashi Verma & S.S. Misra

Carbofuran Seed treatment for the Control of Sorghum Shootfly

A large number of trials were carried out at Delhi to confirm the earlier observation regarding efficiency of carbofuran treatment for the control of shootfly. In all the trials 4 per cent seed treatment (4 parts of insecticide per 100 parts of seeds) gave highly effective control of the pest, the maximum dead-hearts being 3.0 per cent in treated plots as against 81.5 per cent in untreated plots. The carbofuran treated seeds stored for six months did not lose efficiency. The treatment was found to be compatible with Agrosan seed treatment.

M.G. Jotwani, T. R. Sukhani and Santokh Singh

Sex Attractant in Almond Moth *Cadra cautella* (Walker)

The presence of a potent sex attractant in females of the almond moth has just been demonstrated. Extracts of this from virgin females was found to attract large numbers of males in godowns infested with the pest. The chemical composition of the active ingredient suggests that it has a number of unsaturated bonds and an ester group. The active ingredient could also be distilled at 30°C. at reduced pressure.

K.N. Mehrotra & T.N.A. Farooqui

The Pusa Cubicle for the Storage of Grains

Consequent upon the success attained with the 'Pusa Bin' developed earlier in this Division, need was felt for the development on similar lines of still bigger structures where large quantities of grains could be stored in bags. This has resulted in the development

of what is known as the "Pusa Cubicle" which incorporates all the features of the "Pusa Bin". This is the first scientific innovation where an attempt has been made to store grains in bags under moisture-proof and airtight conditions. This has been tried for the storage of nearly 200 quintals of wheat which when dried to below 8% moisture content, has been preserved well for nearly one year. It is possible to store in this structure different varieties of wheat in different bags.

P. B. Mookherjee & T. D. Yadav

Estimate of Damage to Wheat by Germ Feeders

A few pests like *Trogoderma granarium* Everts, *Cadra cautella* (Walker) and *Tribolium castaneum* (Herbst) are known to be specific germ feeders of wheat grains in storage. The extent to which the larvae of these pests feed upon the germ points and render the seeds unviable is not, however, very clearly known. Studies now carried out to find the extent of germ feeding by the larvae of the above three pests in six varieties of wheat and the effect of such feeding on the viability of the wheat seeds during the course of development of the larvae under optimum conditions have revealed that so far as the first two pests are concerned, one larva is capable of feeding on and destroying the germ points on an average 1.55 and 12.28 seeds respectively and rendering such seeds unfit for sowing purposes. The feeding on the germ points is invariably discernible by the naked eye in these cases. In the case of *T. castaneum*, however, one larva is capable of feeding on an average on the germ points of 1.50 seeds which are clearly seen by the naked eye; in addition to damage visible by the naked eye, 21.11 more seeds are damaged which cannot be perceived by the naked eye and are discernible only on minute examination of the germ point under the binocular. It thus appears that the fall in viability of the wheat seeds as a result of larval feeding on the germ point is highest due to *Tribolium castaneum* followed by *Cadra cautella* and *Trogoderma granarium*.

P.B. Mookherjee & S. C. Khanna

Physiological Effects of Radiation on the Desert Locust

Studies on the effects of three sublethal doses of Co^{60} gamma radiation, *viz.* 1, 2.5 and 5 Kr on consumption, digestion and utilization of cabbage by adults of *Schistocerca gregaria* (Forskal) for a period of ten days showed that food intake and faecal production of irradiated insects decrease with time and were dose dependent. Similarly, weight gain by irradiated insects was significantly lower for the experimental period and was dose dependent. There was no significant difference in the average digestibility of dry matter and carbohydrates between irradiated and non-irradiated insects. However, nitrogen digestibility was seriously affected by irradiation so much so that no digestibility of nitrogen could be observed in 1 Kr treatment during the last two days and in 2.5 Kr treatment on the last day of the experimental period. The food and carbohydrate balance of irradiated insects decreased with time and were significantly lower as compared to non-irradiated ones. The nitrogen balance of 1 Kr treated inseets for the last three days of the experimental period was negative suggesting serious impairment in nitrogan utilization.

The rate of consumption and growth of irradiated insects were significantly lower and were dose dependent. There was no significant difference in either gross or net efficiency of food utilization to body matter for the total period between irradiated and non-irradiated insects.

P. J. Rao and K. N. Mehrotra

Agrotis ypsilon Rottenburg (Lepidoptera : Noctuidae)

Bionomics of *A. ypsilon* was worked out on fourteen species of host plants covering eight plant families. On the basis of average larval period, percentage of larvae pupated, average pupal period, growth index and percentage emergence of the moth, gram was found to support the growth of *A. ypsilon* better than the other host plants tested.

Sukumar Ray

Flight Range of Honey bee

The maximum flight range of foragers of *Apis cerania indica* Fabricius when enticed to a feeding dish was to be observed up to 1040 metres at Pusa (Bihar). However, most of the foragers could reach up to 800-900 metres. This information may be useful for these who propose to keep beehives in farms or orchards for pollination of crops as well as for getting honey.

M. Naim & K.G. Phadke

Krishi Vigyan Mela

The Rabi Krishi Vigyan Mela of the Indian Agricultural Research Institute, New Delhi was held from March 17 to 20, 1971 at the Institute Farm. The exhibits depicting findings of the Division of Entomology, included the use of neem seed as deterrent against desert locust, the Pusa Bin and the integrated control schedules for Agri-Horticultural crops.

At the Mela, Smt. Sushila Rohatgi, M.P. emphasized the need for the construction of Pusa Bin in every village and that the Government should make arrangements at block level for the easy availability of polythene, the main ingredient of Pusa Bin. This is particularly noteworthy when Sh. Fakhrurddin Ali Ahmed, Honourable Minister of Food and Agriculture, has declared that the import of food grains will be stopped by the year end.

R. N. Katiyar

Plant Protection Gleanings

The Directorate of Plant Protection, Quarantine and Storage N.H. IV, Faridabad, has recently started issuing a monthly publication entitled "Plant Protection Gleanings". Two issues were published during 1970. Now it is planned to make it a monthly. This is a very welcome addition to Plant Protection publications.

Publication of the Technical Report on Investigations on Insect Pests of Sorghum and Millets

The final technical report of this project has been just published by the Division of Entomology. A limited number of copies of this publication are available for Libraries, Colleges, Universities and other Institutions, free of cost. Those interested in obtaining this publication may kindly write to the Head of the Division of Entomology, I.A.R.I., New Delhi-12.

Books Published

An Introduction to Insect Physiology, by E. Bursell (1970) Academic Press. Berkeley Square House, Berkeley Square, London and III fifth Avenue, New York N. Y. 10003 (U. S. A) Price 70 Shillings

The Physiology of the Insect Central Nervous System, by J. E. Treherne and J. W. L. Beament (1965) Academic Press, London and New York, Price 60 Shillings.

Advances in Insect Physiology, by J. W. L. Beament, J. E. Treherne and V. B. Wigglesworth, Academic Press, London and New York, (in seven volumes) Vol. 1 (1963) Price 110 Shillings, 6 pence; Vol. 2 (1964) Price 77 Shillings; Vol. 3 (1966) Price 88 Shillings; Vol. 4 (1967) Price 95 Shillings; Volume 5 (1968) Price 100 Shillings; Vol. 6 (1969) Price 90 Shillings; Vol. 7 (1970) Price 140 Shillings.

Summer Institute in Insect Physiology and Nutrition

The summer Institute in Insect Physiology and Nutrition would be held from 12-5-71 to 10-6-71 in the Division of Entomology, I.A.R.I. New Delhi-12.

Editors

Please intimate whenever there is any change of address.

Editors

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